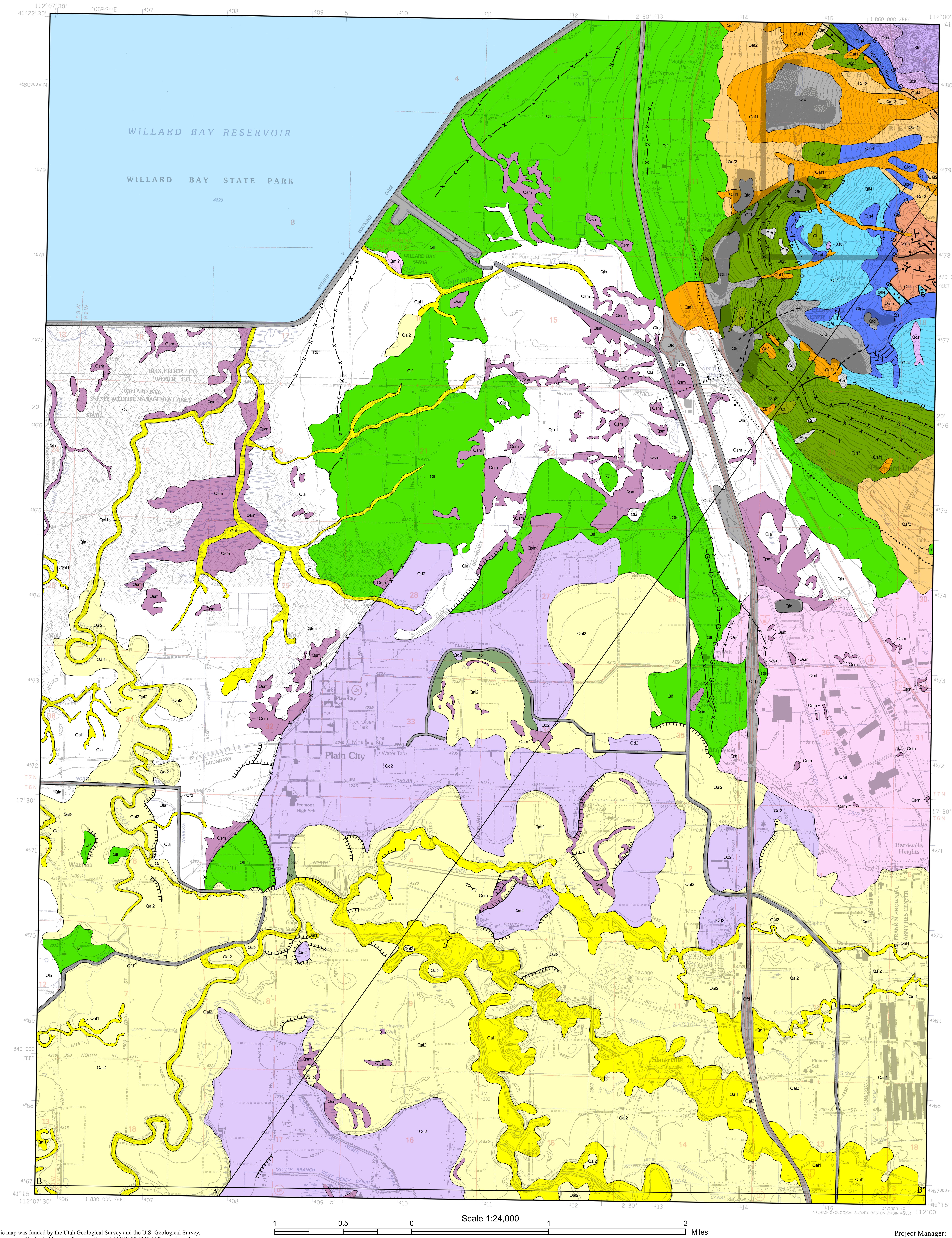

Scale 1:24,000

1 0.5 0 1 2 Miles

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Interim Geologic Map of the Plain City Quadrangle, Weber and Box Elder Counties, Utah

by
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Cross Section B-B': Adolph Yonkee

Base Map: U.S. Geological Survey Plain City Quadrangle, Utah. Revised 1998
Projection: Universal Transverse Mercator, zone 12
North American Datum 1983

Utah Geological Survey
a division of
Utah Department of Natural Resources

DESCRIPTION OF MAP UNITS

Quaternary Unconsolidated Deposits
Units are subdivided based on dominant process (l- lacustrine, d- deltaic, a- alluvial, m- mass wasting, s- marsh, f- fill), and on relative age (1- Holocene (younger), 2- Holocene (older), 3- Lake Bonneville regressive, 4- Lake Bonneville transgressive, and 5- pre-Lake Bonneville). Many of these unit descriptions are taken or modified from Yonkee and Lowe (2004), who mapped the Ogden quadrangle southeast of the Plain City quadrangle.

Undivided deposits

Qu Quaternary deposits undivided as to relative age or genesis– On cross sections only.

Lacustrine deposits

Qlf Lacustrine fine-grained deposits, late Pleistocene to Holocene– Intervals of mixed fine-grained sediment, clay to silt, and intervals of rhythmically interbedded fine to medium sand deposited in low-energy, generally offshore environments at elevations below the Provo Shoreline; thickness typically less than 6 meters (20 ft).

Qlg3 Lacustrine gravel-bearing deposits, Lake Bonneville-regressive– Clast-supported, moderately to well-sorted, pebble to cobble gravel and gravelly sand, interlayered with some silt and sand; deposited and reworked in higher energy environments along the Provo and regressive shorelines near the mountain front and on the Pleasant View salient; mapped at elevations below Provo shoreline; thickness typically less than 6 meters (20 ft).

Qlf4 Lacustrine fine-grained deposits, Lake Bonneville-transgressive– Medium sand to silt deposited and reworked in moderate- to low-energy environments near and below the Bonneville shoreline on the Pleasant View salient in the northeast part of the quadrangle; also includes calcareous clay, silt, and fine sand deposited in deeper water environments in the subsurface within the southern and western parts of the quadrangle; thickness of deposits near the Bonneville shoreline generally less than 6 meters (20 ft).

Qlg4 Lacustrine gravel-bearing deposits, Lake Bonneville-transgressive– Clast-supported, moderately to well-sorted, pebble to cobble gravel, with some silt to sand in interfluve areas and away from mountain front; gravels contain rounded to subrounded clasts, and some subangular clasts derived from reworking of mass-wasting and alluvial-fan deposits; deposited in higher energy environments along shorelines during Lake Bonneville transgression; grades westward away from shorelines into fine-grained lacustrine deposits (Qlf4); thickness generally less than 9 meters (30 ft).

Deltaic deposits

Qd2 Delta deposits, early Holocene– Silt, fine sand, and clay deposited in a platform-like topographic form with an upper-surface elevation of about 1292 meters (4240 ft) (about 8 meters [25 feet] above modern Weber River flood plain). Scattered pebble gravel covers the surface of the platform in some areas. Deposited as a transgression of the post-Gilbert Great Salt Lake shoreline between about 9.7 and 9.4 ka (Murchison, 1989; Sack, 2005); relates to the early Holocene high water level. Northeastern boundary of Qd2 at Plain City is cut by a well-defined, sublinear late Holocene shoreline at 1,287 meters (4,221 ft), and traceable for about 4.8 kilometers (3.0 mi) along the ground surface; formed between 2.5 and 2.0 ka, remnants of this shoreline are exposed elsewhere in the Lake Bonneville basin and are considered to mark Great Salt Lake's late Holocene high water level (Sack, 2005). Qd2 is dissected by and thus predates Qal2 deposits; total thickness about 3 to 6 meters (10-20 ft).

Alluvial Deposits

Qal1 Younger stream alluvium, Holocene– Clast-supported, moderately to well-sorted, pebble and cobble gravel, gravelly sand, and silty sand; deposited along modern channels and flood plains; mapped where fluvial processes are currently or episodically active; exposed thickness less than 6 meters (20 ft).
Qal2 Older stream alluvium, Holocene– Clast-supported, moderately to well-sorted, pebble and cobble gravel, gravelly sand, and silty sand; deposited along inactive flood plains 1 to 3 meters (3-10 ft) above modern stream level; mapped where fluvial processes are generally no longer active; exposed thickness less than 6 meters (20 ft).

Qaf1 Younger alluvial-fan deposits, Holocene– Mixture of gravel and sand deposited by streams, and diamicton deposited by debris flows; forms fans, locally with distinct levees, and channels at mouths of mountain-front canyons; exposed thickness less than 6 meters (20 ft).

Qaf2 Older alluvial-fan deposits, Holocene– Mixture of gravel and sand deposited by streams, and diamicton deposited by debris flows; forms fans that are slightly incised by modern stream channels; exposed thickness less than 6 meters (20 ft).

Qaf3 Alluvial-fan deposits, Lake Bonneville-regressive– Mixture of gravel and sand deposited by streams, and diamicton deposited by debris flows; forms fans graded approximately to the Provo level of Lake Bonneville and that are incised by modern stream channels; exposed thickness less than 6 meters (20 ft).

Qaf4 Alluvial-fan deposits, Lake Bonneville-transgressive– Mixture of gravel and sand deposited by streams, and diamicton deposited by debris flows; forms fans graded to the Bonneville level of Lake Bonneville and that are deeply incised by modern stream channels; exposed thickness less than 6 meters (20 ft).

Qaf5 Alluvial-fan deposits, pre-Lake Bonneville– Mixture of gravel deposited by streams and diamicton deposited by debris flows; gravels contain mostly angular to subrounded clasts; fans have subdued morphology, Bonneville shoreline eroded into toe of alluvial fans; total thickness as much as 30 meters (100 ft).

Mass-movement deposits

Qml Landslide deposits, late Holocene to late Pleistocene– Mixture of silt, fine sand, and minor gravel redeposited in flow slides and lateral spreads (the North Ogden landslide complex) as a result of liquefaction during large earthquakes; on the surface, deposits display landslide-related lineaments and scarps, and hummocky topography; disrupted bedding and sand-filled cracks (injection features) are present in the deposits in the subsurface (Harty and Lowe, 2003); largest landslide is a complex landslide of 25 km2 (10 mi2) of which 6 km2 (2 mi2) (degraded and modified toe and lower portion) occupies the eastern part of the quadrangle; variable thickness. Refer to Harty and Lowe (2003) for more details on this landslide. Based on the presence of subdued hummocky topography, a small, queried lateral-spread landslide is shown on the map near Willard Bay reservoir (NE1/4NW1/4 section 16, T. 7 N., R. 2 W., Salt Lake Base Line and Meridian).

Colluvial deposits

Qc Colluvium, Holocene to Pleistocene– Weakly to non-layered, variably sorted, matrix- to clast-supported, silt, sand, clay and minor gravel of local origin; deposits formed mostly by creep and slope wash; found along some margins of the Plain City delta; thickness probably less than 3 meters (10 ft) in most areas.

Spring deposits

Qsm Marsh deposits, Holocene– Wet, fine-grained, organic-rich sediment associated with springs and seeps; thickness probably less than 1 meter (3 ft) in most areas.

Artificial deposits

Qfd Fill and disturbed land, historical– Land disturbed and excavated through aggregate (sand and gravel) operations as well as Interstate highways, highway interchanges, Willard Bay dikes, and major canals embankments. Mapped outlines of large, active aggregate operations on and north of the Pleasant View salient are taken from recent aerial photographs (2003). Thickness is variable.

Mixed-environment deposits
Qca Mixed colluvium and alluvium, Holocene to Pleistocene– Weakly to non-layered, variably sorted, matrix- to clast-supported, angular boulder- to pebble-sized gravel, sand, silt and clay of local origin; deposits formed mostly by slope wash; found on and north of the Pleasant View salient; thickness probably less than 3 meters (10 ft) in most areas.

Qla Mixed lacustrine, alluvial, and marsh deposits, Holocene to Pleistocene– Predominantly fine-grained sediment (sand, silt, and clay) deposited by low-gradient streams and in marshes, and mixed with Lake Bonneville and Great Salt Lake sediment; total thickness typically less than 6 meters (20 ft).

Quaternary and Tertiary Basin Fill
Qb Quaternary basin fill– Weakly to non-consolidated mixture of alluvial and lacustrine clay, silt, sand, gravel, marl, and thin tuffaceous layers; includes two thicker, gravel-bearing zones corresponding to the Sunset and Delta aquifers (Feth and others, 1966); shown only on cross sections; up to 400 meters (1,300 ft) thick.

Tb Late Tertiary basin fill– Weakly to strongly consolidated mixture of conglomerate, sandstone, mudstone, tuffaceous sandstone, tuff, and lacustrine limestone; shown only on cross sections; up to 2,400 meters (8,000 ft) thick.

Paleozoic Sedimentary Rocks

Lower to Middle Cambrian

C–m Maxfield Formation, undivided– Small, resistant outcrops of light- to dark-gray, medium- to thick-bedded, dolomite and minor limestone; mapped only where not covered by Lake Bonneville deposits on the Pleasant View salient. Includes Ophir Shale where shown in cross sections; up to 150 m (500 ft) thick.

C–t Tintic Quartzite– Main part of formation consists of cliff-forming, white to tan, thin- to thick-bedded, quartz-rich, well-cemented sandstone (orthoquartzite) with some lenses of quartz-pebble conglomerate and thin layers of argillite; argillite intervals increase in abundance and quartz pebbles decrease in abundance toward the top of the formation; basal part of the formation consists of heterogeneous mixture of green to purple to tan arkosic sandstone, quartz-pebble conglomerate, and micaceous siltstone; about 400 to 450 meters (1300-1500 ft) thick; mapped only where not covered by Lake Bonneville deposits on the Pleasant View salient.

Lower Proterozoic Metamorphic and Igneous Rocks

Xfu Farmington Canyon Complex, undivided– Light- to pink-gray, moderately to strongly foliated, hornblende-bearing, granitic gneiss; dark-gray to black, moderately to strongly foliated, hornblende-plagioclase gneiss, with minor garnet, quartz, and biotite; and gray-brown, strongly foliated, schist to gneiss containing variable amounts of muscovite, biotite, quartz, and feldspar, with minor garnet in some layers; in some layers unit also contains widespread, variably deformed pegmatitic dikes and some pods of amphibolite; crops out in the extreme northeast part of the quadrangle. Total structural thickness probably exceeds 6.5 kilometers (4 mi) (Yonkee and Lowe, 2004).

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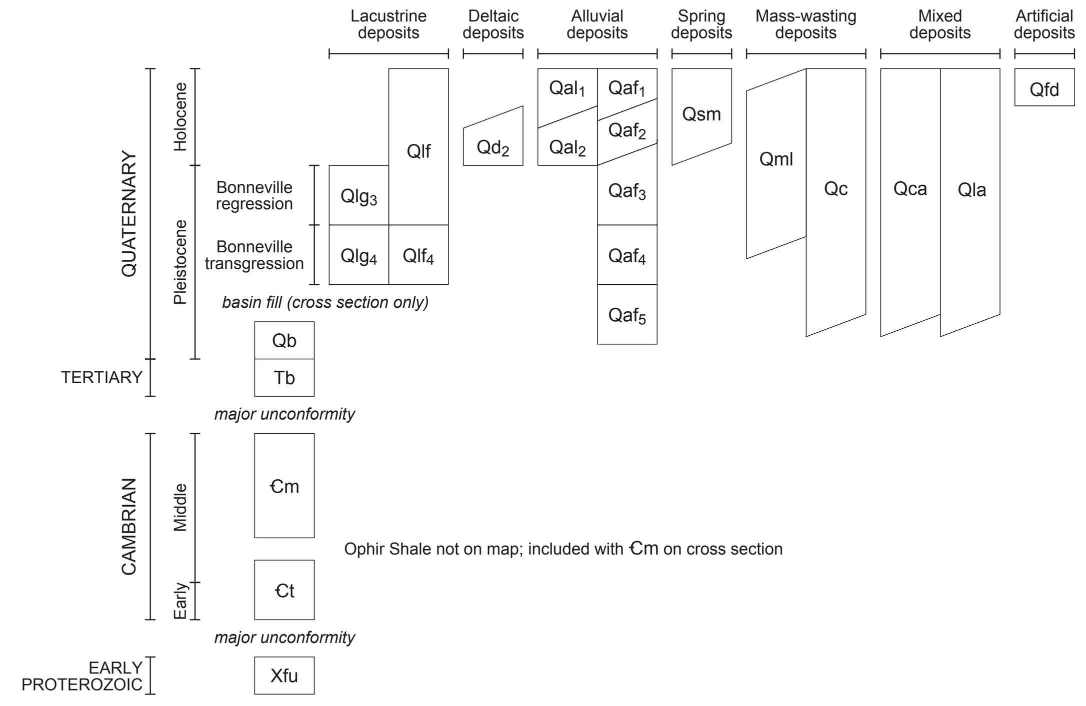
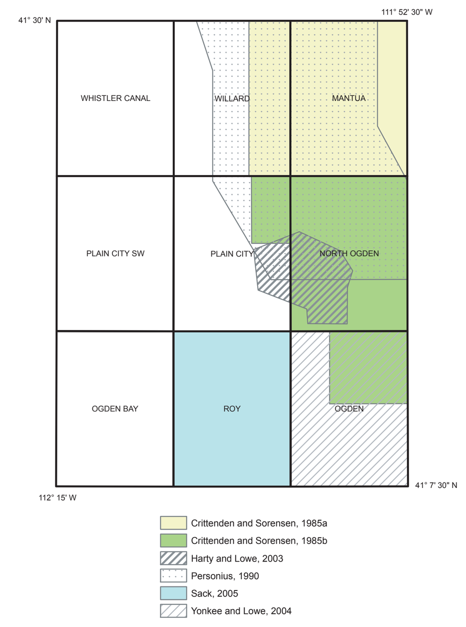
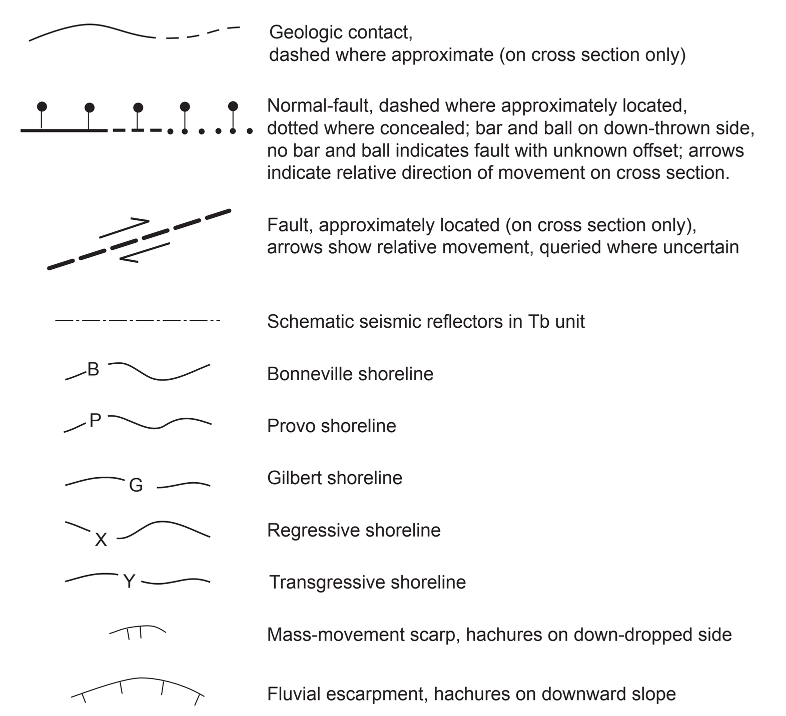
CORRELATION OF MAP UNITS

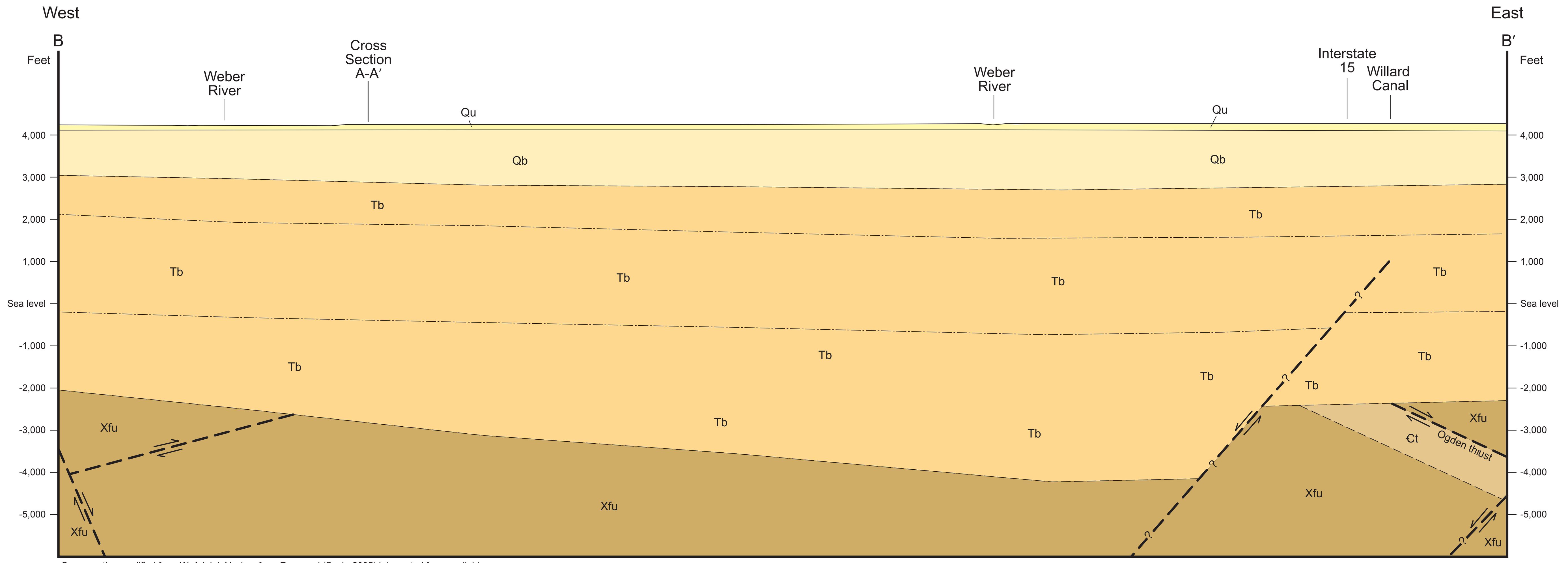




Index map showing geologic maps available for adjoining 7.5' quadrangles.

EXPLANATION OF MAP AND CROSS-SECTION SYMBOLS

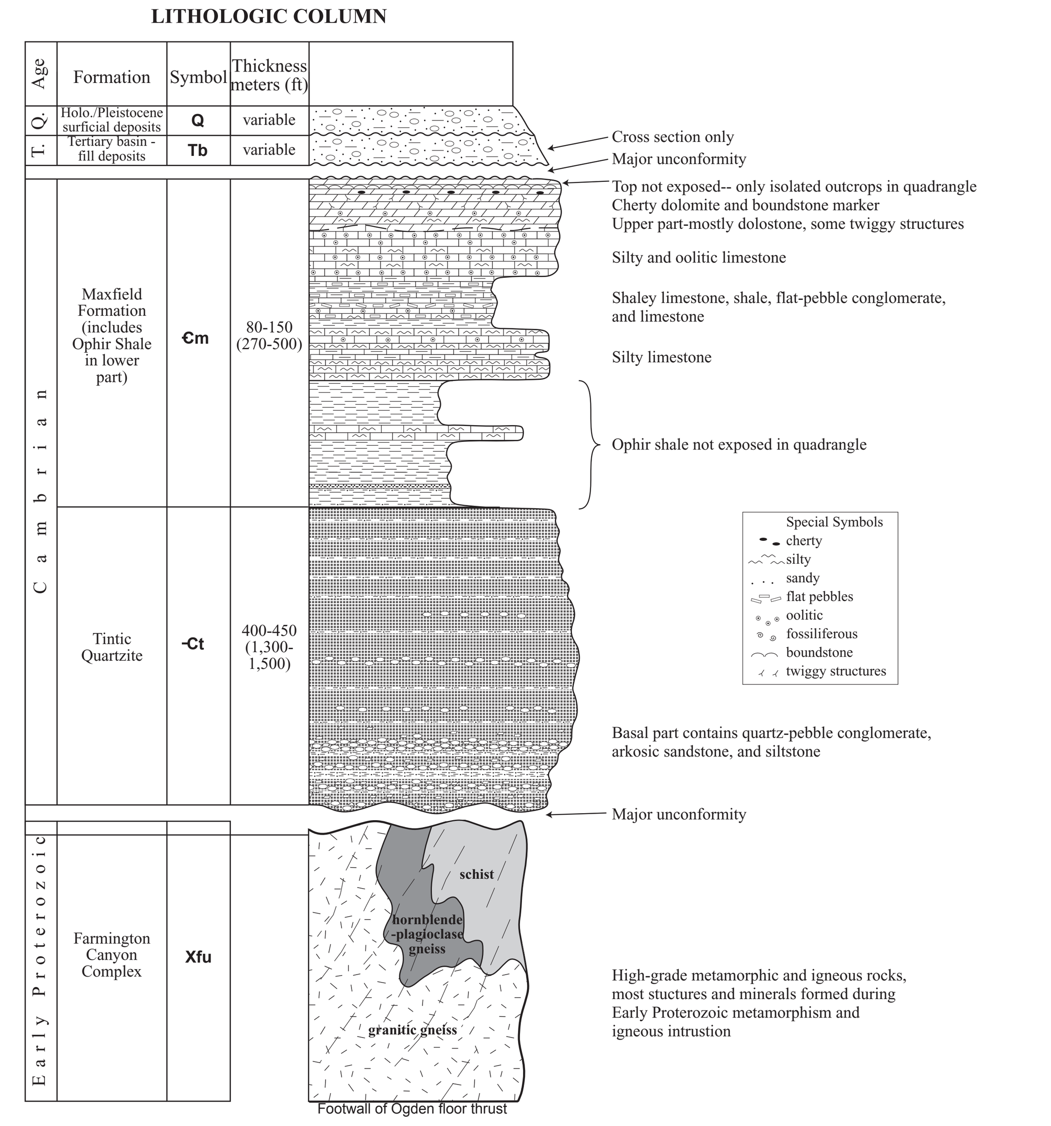




Cross section modified from W. Adolph Yonkee from Roy quad (Sach, 2005) interpreted from available seismic and gravity data (Cook and others, 1967; Mc Neil and Smith, 1992). Structure of Ogden roof thrust system in subsurface uncertain.

Topographic profile is approximate

LITHOLOGIC COLUMN



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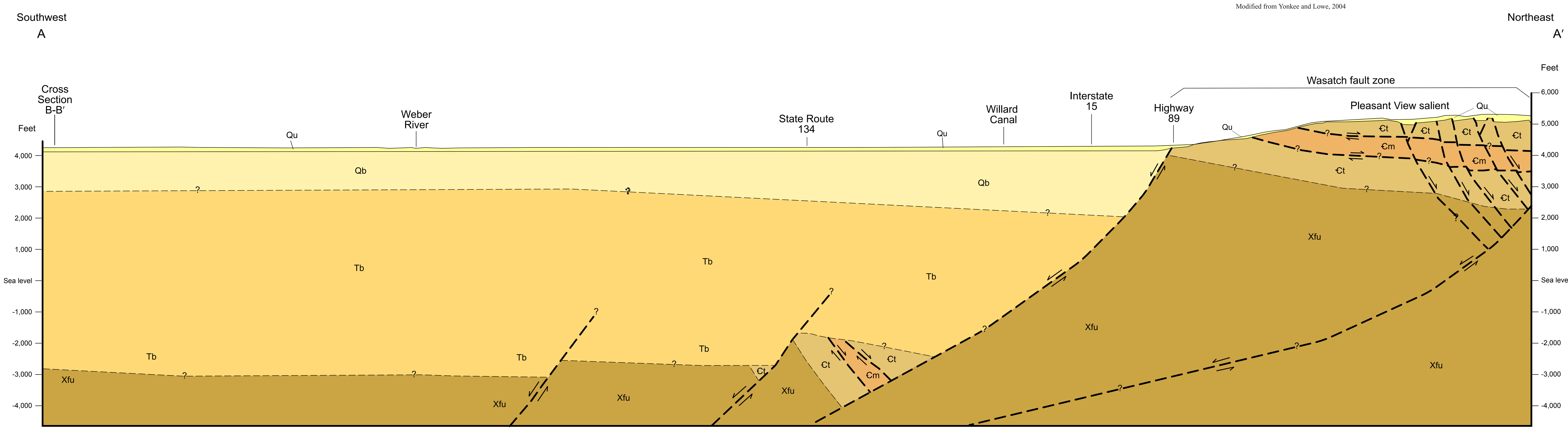

Cross section compiled by Stefan M. Kirby from A-A' of Crittenden and Sorenson (1985) along the Pleasant View salient and extended into the basin using fault locations, offsets, and geometries from Zoback (1983), Personius (1990), and Evans and Langrock (1994). Depth to bedrock and subsurface geometry in the basin is inferred from Zoback (1983), Mabey (1992), McNeil and Smith (1992), Saltus and Jachens (1995), and Sack (2005). Faults in the Pleasant View salient are from Crittenden and Sorenson (1985). Cross section is highly interpretive below sea level.